

AMENDMENT

Serial Number: 10/776,472

Filing Date: February 11, 2004

Title: Highly Active Liquid Melts Used to Form Coatings

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NANO004**Amendments to the Claims**

This listing of claims will replace all prior versions and listings of claims in the subject application.

Listing of Claims:

What is claimed is:

1. (Withdrawn) A metallic alloy for coating a metal surface comprising a deoxidizing element, wherein said deoxidizing element reduces a metal-oxide layer on said metal surface.
2. (Withdrawn) The metallic alloy of claim 1, wherein said deoxidizing element is a transition metal, selected from the group consisting of manganese, chromium, vanadium, titanium, zirconium, hafnium, niobium, tantalum, aluminum, lanthanide metals in combination with and oxygen seeking nonmetal/metalloid selected from the group consisting of silicon, carbon, boron, phosphorous, sulfur and combinations thereof.
3. (Withdrawn) The metallic alloy of claim 1 wherein said deoxidizing element is further characterized in that it does not chemically interact with said metallic alloy.
4. (Withdrawn) The metallic alloy of claim 1, wherein said metallic alloy base metal is selected from the group consisting of iron, nickel, cobalt, manganese, chromium, titanium, vanadium, zirconium, niobium, hafnium, tantalum, tungsten, and aluminum.
5. (Withdrawn) The metallic alloy of claim 1 wherein said deoxidizing element is present at a level of 5 to 70%.
6. (Currently Amended) A method of forming a metallic coating on an oxidized metal surface layer comprising:

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(a) providing an iron based metallic coating alloy wherein said alloy includes manganese, boron, a deoxidizing element including a metal selected from the group consisting of chromium, vanadium, titanium, zirconium, hafnium, niobium, lanthanide metals and combinations thereof and an oxygen seeking nonmetal/metalloid, wherein said deoxidizing element is present between 5%-70% in said iron based metallic coating alloy;

(b) melting said iron based metallic coating alloy to a liquid state;

(c) applying said liquid melt of said iron based metallic coating alloy to said oxidized metal surface and removing said oxidized metal surface layer with said liquid melt of said iron based metallic coating alloy to provide a metal surface that is relatively clean of said oxidized metal surface layer and susceptible to receipt of a metallic coating; and

(d) applying an iron based metallic coating alloy to said metal surface that is relatively clean of said oxidized metal surface layer wherein said iron based metallic coating has an ASTM C633 bond strength of at least about 5500 psi.

7. (Previously presented) The method of claim 6 wherein said step of melting said iron based alloy to a liquid state comprises forming a liquid state with no precipitates of said deoxidizing element existing in said liquid state.

8. (Cancelled)

9. (Original) The method of forming a metallic coating according to claim 6, wherein melting said metallic coating alloy and applying said liquid melt comprises thermal spray coating said metallic coating alloy onto said metal surface.

10. (Original) A method of forming a metallic coating according to claim 9, wherein thermal spray coating said metallic coating alloy comprises at least one of wire-arc spraying, plasma spraying, flame spraying and high velocity oxyfuel spraying said metallic coating alloy onto said metal surface.

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11. (Currently Amended) A method of forming a metallic coating on a metal surface comprising:

(a) providing an iron based metallic coating alloy wherein said alloy includes manganese, boron, a deoxidizing element including a metal selected from the group consisting of chromium, vanadium, titanium, zirconium, hafnium, niobium, lanthanide metals and combinations thereof and an oxygen seeking nonmetal/metalloid, wherein said deoxidizing element is present between 5%-70% in said iron based metallic coating alloy;

(b) melting said iron based metallic coating alloy to a liquid state;

(c) applying said liquid melt of said iron based metallic coating alloy to said metal surface wherein said metal surface contains an oxidized surface layer;

(d) reducing said oxidized surface layer with said liquid melt of said iron based metallic coating alloy; and

(e) forming a metallurgical bond at said location where said oxidized surface layer has been reduced by said deoxidizing element wherein said metallic coating has an ASTM C633 bond strength of at least about 5500 psi.

12. (Currently Amended) The method of claim 6 wherein said oxygen seeking non-metal/metalloid is selected from the group consisting of silicon, carbon, ~~boron~~, phosphorus, sulfur and combinations thereof.

13. (New) The method of claim 6 wherein said manganese is present at about 2.3 %.

14. (New) The method of claim 6 wherein said manganese is present at about 0.8 %.

15. (New) The method of claim 11 wherein said manganese is present at about 2.3 %.

16. (New) The method of claim 11 wherein said manganese is present at about 0.8%.